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Module 03: Energy & Climate Change

Urban EcoLab


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## Student Pages - The Greenhouse Effect Model

Center for Urban Resilience

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### The Greenhouse Effect Model

Set up your greenhouse model as follows:

1. In both bottles, place a small layer of dirt or gravel in the bottom to simulate the surface of the earth.
2. Tape a piece of cardboard to the back of each thermometer, to shield it from the direct light of the lamp. Then tape the thermometers to the inside of the bottles, facing outward.
3. On one of the bottles, cover the opening at the top using clear plastic wrap.
4. Position the lamp about 6 inches away from the tops of the bottles, centered between the two. If it is a sunny day, this may be done outside without lamps.
5. Then turn on the lamps and record both temperatures on their student sheet, every minute for 15 minutes.

Record the temperature inside each bottle every minute for ten minutes, then complete the questions below.

Time (minutes)	Temperature of Bottle #1 (without plastic wrap)	Temperature of Bottle #2 (with plastic wrap)
0 (start)		
1		
2		
3		
4		
5		
6		
7		
8		
9		
10		
11		
12		
13		
14		
15		

Questions:

1. Did your results agree with your predictions? Which bottle reached the highest temperature? What reasons could there be for the difference in temperature of the two bottles?
2. In what ways does this activity model the Earth? What does each bottle represent?
3. In what ways is this model different from the actual situation on Earth?
4. Draw, for each bottle, the flow of energy into, within, and outside of the bottle. (Hint: use as a guide the diagrams of Earth's greenhouse effect.)